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AN OBSERVATIONAL DIARY ON THE DOMESTIC HABITS OF THE CARRION-CROW (*CORVUS CORONE*).

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HAVING found a Crow's nest near the French town in which, at the time of making these notes, I was living, I determined to watch it, in order to gain some insight into the domestic habits of the species. The nest was situated in a small beech-tree, being one of a row, forming the line of intersection of two meadows, or open spaces of pasturage, lying a little off one of the roads from the town. It was easy to watch, which is the only essential point. The following is my diary of observation. I should here premise that the pronoun "he" or "she" does not imply certainty in regard to the bird's sex, but likelihood (in my view) only.

April 18th, 1910.—Got into position at 4.30 a.m., and heard the first very deep, hoarse "arr" at 4.45. It was uttered three times, and twice, again, five minutes afterwards, not by the sitting bird—for the nest was occupied—but some other one—the partner presumably—in the neighbourhood.

5.4.—Crow flies up to the nest, and for an instant stands in the cup of it, above the sitting bird—well in view, though partially concealed by the cavity. He then flies down, and is followed almost directly by the sitting bird, who before was hardly to be seen. Both, I think, go down on the ground—probably to search for food—though I cannot see them. It was certainly the bird who flew up to the nest, who first flew off it

again, so that there was no change upon the nest. The nest, therefore, was now empty, and empty it appeared to me to remain for the next twenty minutes or so, when, all at once, I thought I saw something black move in it. The glasses, however, revealed nothing, but five minutes afterwards, having the same impression and bringing them to bear quickly, I saw unmistakably the upturned head and beak of the sitting bird, and I could now always see its occasional movements on the nest. One of the birds, therefore, has returned unnoticed by me, which I can hardly understand, as even when writing the above—in pencil and more shortly—I was constantly turning my eyes up to the nest. However, the fact is certain.

At 5.45 the partner bird flies silently to the nest, coming from somewhere behind me. I got the glasses on the nest, a moment before he went down upon it, so that I saw everything clearly. The arriving bird just bent, for a moment, over the sitting one, and then flew almost perpendicularly down to the ground. All was in silence, as was also the case in the previous visit. Some ten minutes later a bird, which I took to be the same one, passed a little in front of me, in a drifting manner—flying a little sideways, that is—as though searching the ground—for the height was but moderate. I do not think he saw me, as I sat motionless at the foot of a baby tree, and a good deal concealed by gorse-bushes and other small trees, &c.—the gorse, by the way, which abounds here, is now a most magnificent sight. I sat where I was till well past 7 with my eyes fixed on the nest almost continuously—never off it but for a few seconds, during which they still guarded the neighbourhood—but there was no further visit from the partner bird. Several times I saw what I thought to be the latter beating round about at a greater height, as though quartering the ground for food, but as, more often, there were two birds doing this, I could never be sure that it was he, even when I did not see another. There would seem to be another pair that have their nest at no great distance.

What is shown in regard to the incubatory habits of Crows by the above observations? As I say, it was the bird that flew up at about 5 o'clock, that first went off again, leaving the one who had been there when he came, still there. As it was dark



when I came, the latter may be assumed to have been on the nest all night, and would therefore, most probably, be the female. She was not relieved in the duties of incubation, therefore, but sat on though only for a few moments longer. When she also flew down both birds were out of my sight, so that even if I had not missed the return, shortly afterwards, of one of them, I could not have told which one this was. Assuming it to have been the female—which I think the more likely—then she was visited twice on the nest by the male whilst I stayed (which was till about 7), once, roughly speaking, at daybreak, and, again, about forty minutes later. I certainly did not see the sitting bird fed by the visiting one on either of these occasions, but with so deep a cavity to the nest this would have been difficult, and she might very well have been, each time. In fact, the pose and actions of the male, on each visit, were quite consistent with this supposition, and it seems, in itself, more likely that he came with some ulterior object than merely to pay an affectionate visit, though, to be sure, there is nothing so very unlikely in that.

I think it more likely that it was the female who returned, to sit on the eggs, than that it was the male, for if there was a change upon them at all, why did it not take place when the latter first flew up at daybreak? Again, if it had been the male, then the female, relieved after her all night's sitting, would probably only have returned to the nest when she was again ready to take her place upon it. It does not seem likely that she would have come back to it again, shortly afterwards, either to feed the male or merely to make him a visit. But likelihood and unlikelihood are all I have to go upon.

April 19th.—At same place at same time (4.30 a.m.) as yesterday, and there waited, with my eyes always turned on the nest, till 7.30, except that sometimes, during the last half-hour, I turned the glasses, for a few seconds, elsewhere; but even then I gave some side-glances towards the nest, so that it was never absent from my view in such a way or for such a time that I could have missed anything.

During the whole of these three hours nothing whatever happened. There was no visit, and the sitting bird, whose head I could see plainly all the while, never left the nest. This

supports my observations of yesterday, and the inference I drew from them. Had it been for the purpose of relieving the female in her incubatory duties—had this visit really represented a change on the nest or had this taken place a little later—there is little doubt that the same thing would have taken place this morning. It would then be a regular custom, in all probability, for the male to relieve the female at or not long after daybreak. But if the female is only fed by the male, whilst she incubates, or if he merely pays her visits, there is no reason to expect regularity or anything approaching it. The bringing of food would be dependent on the finding of it, and visits, as such, would, of course, be quite casual.

Whilst it was still dark, or almost dark, there were the same two bursts of croaking—first three and then two “arrs”—as yesterday, and from about the same place. After that I only heard distant ones, and it was not till long afterwards that I saw a Crow flying near the nest, but he did not go to it, and soon disappeared. I do not believe that either of the Crows saw me the whole time I sat watching both yesterday and to-day, and I am quite certain that this was not the case at the time when the male paid his visit to the nest. It was dark when I came, nor did any Crow go off startled on my way to the place. The Crow on the nest and her partner, somewhere near, would therefore have awakened with the dawn, in the usual manner, and, by experience, would not have been expecting to see a human being for some little while. The wariness of the most wary birds can be completely discounted by taking advantage of the darkness—no other way, in my experience, is equal to this. I watched the nest from a well-sheltered plantation on the other side of the meadow.

In the afternoon I watched the nest from 3 or thereabouts till 6.45. No visit was made to the nest, which had the appearance of being empty, but I have no doubt the bird was there, as to test this, on subsequent occasions, I have struck the trunk of the tree with the stick of my camp-stool, when it has flown off. The sitting bird may either be plainly visible or entirely concealed in the cavity.

April 20th.—Was down at 10.30 a.m., but did not stay long, and the bird may or may not have been on the nest, for all I

could tell. At 2.20 I returned, when I thought I saw it there, but was unable to say.

April 21st.—At place at 7.25 a.m., and watched the nest till 8.35 a.m., when the bird flew off it, in silence—there had been no previous visit from the partner bird. At about five minutes to 9 a Crow—one of the pair, as I assume—perched on a low tree in the neighbourhood, then flew off it, and a little later the two were flying about in each other's company. At 9.30 one of them flew into a tree belonging to the row in which the home one is situated, being the eighth away from it (there being but a step or two between each), then into another of them, nearer, and I thought she would go to her nest, thus by easy stages. But she flew off again, and soon I saw the pair flying about, and expatiating, as it were, together, as before. Some minutes later she, or one of the birds, flew into the same tree, then off again, and at 9.30 I saw her sitting on a low, lopped tree-stump, from which she, in a moment, flew to the ground. At 9.55 I, all at once, saw a hawk—a Kestrel—glide from the nest, on the further rim of which he must, I think, have been settled. At 10 the Crow was flying about over the ground, and then a little higher, as though feeding from place to place. The boy now appeared on the scene, with his cows, and cracking his whip at short intervals (yet withal I noted that he had a paper and was reading it), and, thinking that the bird would not return to the nest whilst he was there, I rose and began to walk away. In this, however, I was mistaken, for I had only gone a few yards when I saw her in the same tree as before, or a neighbouring one, and standing still, where I had a good view of the nest, in a few minutes—just at 10.7—she flew on to it and disappeared, having thus been absent from the nest over an hour and a half. It is curious how the bird's going down on the nest almost exactly coincided—just after, not before—with the arrival of the boy and the cracking of his whip. Can she have adopted this as a signal?—but this hypothesis did not continue to recommend itself.

April 22nd.—Getting to the place at 9.35 this morning, I watched the nest for a full three hours, during which time no bird either came to or left it. All the while, however, the Crow kept about in the neighbourhood, feeding, for the most part,

over the land, as far as I could judge, but time and again sitting in one or other of the trees of the row, in more or less close proximity to the home one, sometimes flying from one to another till within a tree or two of it, but always floating away again, generally downwards, evidently on to the ground, though my position never allowed me to see her settle. Once or twice she was joined by her mate, but not for long. Both were very silent. Only once (or twice perhaps) I heard a subdued croak or two, but this was not very near, and may have been uttered by another bird. From the above observations I have no doubt that the nest was empty all this time. I might have tested it, but dislike all obtrusion into what I am watching.

April 27th.—Watched the nest for about half an hour in the afternoon, during which time it was neither left nor visited by either of the birds. One of them kept about in the neighbourhood, but I cannot say whether the nest was empty or not. It would seem, therefore, that incubation is still proceeding.

April 29th.—In the morning I watched the nest for a time sufficient to make sure that the eggs are not yet hatched. I saw neither of the birds, though one of them was very probably sitting. The nest is visible from the road by which I cycle to get to it. This afternoon, therefore, I fixed my eyes upon it, as I passed along this road, and had the luck to see the bird fly off it, being then about 6.40. Had the other bird first flown up, and had there been a change on the nest, I should have seen this just as plainly, but such was not the case any more than on other occasions. It was a solitary departure, and the nest was left empty, though I stayed for a little to make sure of this. It is becoming more and more plain that one of these two Crows is alone incubating. I have now seen the sitting bird leave the nest three times, each time on a different day and at a different hour—once, namely, at 5.4 a.m., once at 8.35 a.m., and this last time at 6.40 p.m.—and there has not, on any of these occasions, been a change on the nest, though, on the first, there was what might very well have been mistaken for one—a visit, namely, and quick succeeding departure of the visiting, not of the sitting, bird. The latter, indeed, followed almost immediately, but the nest was left empty. Three times is certainly not very many, yet if the male really shared in the duties of incubation there

would probably have been the change on each occasion. Moreover, the infrequency of these exeats on the part of the sitting bird is itself evidence that she alone sits, for, if the duty were shared, why should she have to sit so long, and why should the eggs be left so long uncovered? This last must be necessarily the case, however, if the bird who does all the sitting has likewise to procure her food, as she must, if not fed on the nest by her mate, of which latterly there has been little evidence—she cannot, at any rate, be sufficiently fed there.

May 9th. — This afternoon being a little finer than it has been for the last week or more, I cycled to the first nest along the La Guesnière road, and had it under observation about 4. I assumed that the eggs must now be hatched, and two visits which were paid within the next thirty-five minutes would seem to support that view. The first was at 4.15, and the next at 4.35. I thought, each time, that the bird that came was the one that went away, but it was a long view, this time (I was not in the accustomed place), and the nest is now almost concealed amongst the growing leaves of the beech it is in. I supposed also that when the visiting bird, each time, flew away, the nest was left empty except for the young, but here I was in error, for on walking up to the tree after the last visit and striking it with my stick, the bird at once went off. This was not till ten minutes after the last visit, and it would have been possible, certainly, for one of the birds to have come, since then, without my seeing it, but I do not suppose this to have been the case. What I think likely is that, the young being yet of tender age, the hen Crow was covering them, and that the male twice brought food, which she probably received from him, and then fed the chicks with.

My observations on this pair of Crows ended here.

March 29th, 1910.—About a week ago I saw a Crow busily engaged in chasing away several Magpies, not only from three or four tall slender trees close together, in one of which it had its nest, but also from various other trees, not far off, round about. In this the Crow had a good deal of trouble, as the Magpies were always returning. After a time it was joined by another Crow, which, however, did not take so active a part in

the drama, nor did I see either of the two actually go to the nest, though I could only explain their action by supposing it was their own. This morning I saw the same thing reversed, for a pair of Magpies, with an undoubted nest, kept attacking a Crow that insisted on settling in one of a row of trees—also tall and slender—in which it was placed. Both were equally persevering, the Crow, though often chased away, always returning, and settling generally in the last tree of the row, where he would be left alone sometimes for a minute or two, but before long one of the Magpies always flew at him, and put him to flight. The Crow defended itself, but not, it would seem, very successfully, and in the last attack upon him, made, with great spirit, in the air, a large black feather floated to the ground, which I made no doubt was his. Yet this did not drive him from the trees, and it was only on my approaching nearer that he finally left them. Thus we see that both the species look upon the approach of the other to within a moderate distance of their nest as an intrusion.

May 2nd.—Walked out in the afternoon, and located another Crow's nest in course of construction, a discovery to which I was led by observing the pertinacious attacks upon one of its joint owners by a Magpie in the neighbourhood of its own nest. The Crow was ready to defend himself, but the Magpie was too quick for him, and by constantly flying at him and pecking him in the air at last drove him out of the little plantation in which the drama was enacting. As soon as he took to flight he was joined by another, who carried a good-sized stick. As they went down amongst trees some way off, I naturally concluded that the nest was situated in one of these, and found what looked like the commencement of one. I sheltered myself at some distance, and waited for about half an hour, but to no purpose. Meanwhile, however, the Crows had floated over these trees in the direction whence they had come, and, returning, I found the same bickering going on between them—or one of them—and the Magpie. A nest of the latter, from which the sitting bird went off tardily on my striking the tree, explained the matter as far as the Magpie was concerned, and I began to suspect the Crows of pillaging or designing to pillage this nest, to build their own, especially on their appearing again (for they had again

been driven out) whilst I sat under a tree near, evidently only deterred from re-entering the plantation by my presence. I now sheltered myself very effectually beneath a hazel-bush at the foot of a tall tree, and before long the two Crows appeared, both carrying sticks, and the mystery was soon explained by their flying into the summit of a lofty fir quite near me, and busying themselves with the construction of their nest—as I could make out, but not the nest itself; owing to the opacity of the foliage forming the fir's crown. Building now went on continuously, at irregular intervals, for more than an hour up to 6 o'clock, when there was a longer interval; but as I walked back I again saw the two birds, from a distance, come down together into the same tree. Both birds built, one being generally there at a time, but, two or three times, both were in the tree, and I think both building, together. Had this tree been as the others, I should have had a fine view of their operations, being so near and so well concealed, but the nest, besides being high up, is completely shrouded amidst the heavy pine-fronds. This time, however, I often saw the Crows collecting their materials, and it was never on the ground that they did this, but always in trees, the growing twigs of which they seized in their bills and broke off, often having to pull and tug at them with great force to do so. They often dropped the twig they pulled off, and did not then pick it up from the ground again, but began pulling at another, and once one of them dropped the one he was flying with, and left it. Whether this was done, each time, accidentally or purposely, I could not be sure. I think the first, but still they seemed to pick out particular twigs, and to prefer such as were both long and stout. It might be argued, too, that they would have picked them up again had they not intended to discard them. The Crows never went to the Magpie's nest, and had evidently no design upon it, as, indeed, it is hardly to be supposed that they should have had, taking the strength and vigilance of the foe into consideration. Also the twigs of any nest would not have been selected, and pulled by themselves; that they should be thus pulled and not merely collected, as sticks, from the ground, seemed to be a *sine qua non* with the birds. The nest, however, was, no doubt, the *teterrima causa belli*—at least on one side—the Crows coming too near to it in

the opinion of its owners, who a little before I left made a fresh joint attack upon one of them in particular. The latter, in defending himself, made a sort of backward movement, jerking his wings; so, at least, it appeared to me. At any rate, he jerked his wings, and the attacking Magpie swerved off, as though they were his beak, whether or not it was only that that he feared, as seems most probable.

May 3rd.—Got into place to watch the building of my last-found nest in the fir-tree at 4.40 p.m., the Crows not being then about.

4.46.—A visit—single—direct flight on to nest.

4.49.—Second bird flies on to nest with stick, just leaves it, and goes.

The first-come bird, therefore, is still on the nest, and I now see him there. I did not notice a stick in his bill when he came. If he had one it was small.

4.57.—One of the birds—as I supposed, the first owner—off, but to my surprise the other follows. He had evidently returned without my seeing him, having been concealed, I suppose, by the gloom of the fir-tree, as he flew in from behind it. A bird now flies in again, and is off the next minute.

There is now an interval, both birds sitting quietly in an adjacent tree and preening themselves. This tree is very little removed from the one in which there is the Magpie's nest, but there is no interference from that quarter. Though close, the insufferable degree of proximity has not, it appears, been reached.

5.20.—One of the birds now begins twig-pulling in the tree he is in. He soon gets one, but, for some time, sits perched with it in his bill. I lose him for a moment then, then all at once there is an "arr, arr, arr," and both are in flight, the one still carrying his twig. In a minute or two they are back again—the twig still held—and perched, side by side, in the tree next to that in which they were before.

5.32.—The bird with the twig flies away, still keeping it, leaving the other one sitting. He passes over the nesting-tree to a line of trees some way off, where I lose him, but in less than three minutes he comes flying up again—stick and all—as the sitting bird "arrrs," and again they sit side by side. Soon both

are off and out of sight, but I hear not far off that curious more human-sounding note that I have remarked in another pair of birds, and which I suppose (for the present) to be confined to the male. After staying till a little after 6, I left, and had hardly got out from under my bush when I saw both the birds still sitting where they had been before. They must have come back silently from another direction, so that I missed them, but not long ago. They now seemed settled to roost, and when I passed along the road, at nearly 7, the tall fir visible from it stood sad and solitary. Had they suspected my presence? I do not think so; I was too well hidden. I recall that other instance when one of another pair, though having a beakful of dried grass or other material, flew down and fed over the land, where he was joined by the other, and both came so near me as to make me feel that they had no idea of my whereabouts. I have also at various other times seen a Crow thus fly and perch with a stick in its bill, and it subsequently transpired that I was nowhere near its nesting-tree. This tardiness in bringing the gathered materials is a normal trait, therefore—to be observed in other birds also—and need not be attributed to fear or suspicion. It may result from a conflict between different impulses—as, for instance, hunger and the nest-building one—for in both the previous instances the birds laid down what they were bringing and began to feed over the land; and so, too, it may have been in this case, for there was a little time for supper before bed. Thus, bit by bit, we get at their daily round.

May 4th.—I was unsuccessful in trying to watch the birds building this afternoon. They went off—one carrying a stick—on my entering the little “shore” or dingle where the nest is situated, and, though I waited under my hazel-bush till considerably past 5 (from 3.20 p.m.), they did not come to the tree again, but only, towards the last, into the neighbourhood, though I believe they had then forgotten all about me. After I had left my place—towards 6—they went down apparently to feed over some potato-planted land, but I did not see them hack at the plants or pull them up. Then they both flew to the nest—one having a stick which it must have got since its return—but the building was not continued, and I left them, still on the land, about 6.30. Before coming to the nest these Crows had

settled in some neighbouring trees, and, getting too near to another Magpie's, were vigorously attacked by the owners. Further on they met with the same reception from a Jay.

May 5th.—Got down at 5.20 a.m. The Crows were about, and I saw them into some trees a good way off before taking my place. Yet when I had taken it, I observed them in their accustomed ones near by, but they did not appear to have noticed me. They then went down on the potato land, and the first visit to the nest was not made till about 6. It was a single one, and so were six others between then and 6.45. At 7.25 and 7.27 there were two more such visits, then a double one at 7.32, and a single one again, at 7.34—building been still in progress when I left my place a few minutes afterwards, and when I started to return at 8.5 or so. In all but the first visit or two, when it was sticks, the birds carried little bundles of soft stuff—dry grass it looked like—so that they must now be lining the nest. By a double visit I mean that both birds came together, or nearly so, and were on the nest at the same time. Some of the single ones were made by the two birds alternately, but, as a rule, I could not tell if this were so. My notion is that whilst the male, equally with the female, brings and places the materials, the latter stays longer and does most of the actual architecture. At any early stage in the building the Crows were attacked by the Magpie that I had first seen them engaged with—the male, as I believe, who acts as sentry—so that I saw the latter and one of them tumbling through the air in a grapple. This was close by the nest of the Magpie, but, further than this, I did not see the actual origin of the fracas. I have no doubt, however, from their general conduct, that the Crows had merely come inadvertently too close to the nest without any idea of interfering with it. They often retaliated after this by attacking and chasing away the Magpie, but it was the offensive-defensive strategy, nor are they so redoubtable as the latter, who shows both superior vigour and greater activity. At 3 p.m. I was in my place in the hazel-bush again, but saw nothing further. In coming up I had startled the birds, who were in a tree a little to one side of the dingle. They went off with loud “arrrs,” and did not return whilst I was there.

May 10th.—This evening, at ten minutes past 7, I saw one

of the birds fly into the tree after they had both peregrinated about the place for a little, at short intervals. As this bird went down on the tree, I put up the glasses, but should have done better not to, as I could not catch it again with them. I have no doubt it went on to the nest, and was lost in the very act of my raising the glasses. It looks as though incubation were now begun.

May 13th.—Got to my place at 4.15 a.m. All was quite still and silent—there seemed to be no life in the dark fir-tree—but at 4.20 one of the fronds at its top dipped and swayed, then came some vigorous “arrreings,” and off the bird went. After an absence of less than ten minutes, in which I heard her voice (or her mate’s) always near about, and in the trees, she returned, or, more strictly, a bird came on to the nest. In another five minutes the partner bird flew up, went first into a tree close beside the nesting one, and then into the latter. I did not observe any materials in the bill either of this or the other bird, but this does not exclude the possibility that the interior of the nest is still being shaped. If this is not the case, and if incubation is proceeding, then I cannot say for certain whether there was now a change on the nest or not. I can say, however, that the exit of one of the birds, shortly afterwards, was from precisely the same spot where the bird alighted, that the dark mass of the nest was visible a little under this, and that there was no commotion or appearance suggesting a change, as I believe there would have been had there been one. The time for which the two birds were together on or at the nest was also a little longer than it generally is, in my experience, when one comes for the special purpose of relieving the other on the eggs. During this time there were low, croodling, affectionate sounds, very pleasant to hear, all in the Crow intonation, but much softer. The bird left on the nest did not stay there five minutes after the other had gone, but flew off, then in about another five minutes returned—strictly there was a return to the nest, and then, at similar short intervals, another departure and return. Since this time—it is now, when I write, 5.20—there has, I believe, been continuous sitting or continuous occupation of the nest, but in this I may be mistaken, for I have not kept my eyes continuously fixed on the tree, and now on leaving, a little later, I

see both the birds in a neighbouring tree. The above observations, then, hardly suggest the female bird having been relieved on the eggs by the male, or why should the latter, having taken his place, have twice left the nest and returned to it at these short intervals? The facts seem more in accordance with the unassisted incubation of the female, or perhaps with incubation not having yet seriously begun—all the eggs perhaps are not yet laid.

Down again at 3.45 p.m.

3.50.—Bird off, unrelieved by the other.

4.10.—Bird on.

5.15.—Off again, and I did not see any return to the nest or tree between this and 6.30 p.m., when I left. The nest, therefore, has been left twice, but there was no change upon it, either time.

May 15th.—Watched the tree from 2 p.m., and at 2.35 the Crow flew off, presumably from the nest. Either it uttered its note, as it flew, or the partner bird did so, somewhere near, but I think the first, and afterwards I saw the two together—no change, therefore.

2.40.—Bird on.

3.15.—Ditto, from which I learnt that it must have gone off some time between these two, but this I missed.

3.40.—Bird off.

I then walked to the tree and struck it violently several times with my walking-stick camp-stool, but no bird flew out. It is clear, therefore, that, though I missed the second going off, there had been no change on the nest, for if one had gone on to them then, some time between 2.40 and 3.15, my striking the tree would in all probability have driven it out. But this is made almost superfluous by the fact that, before the bird came on again, at 3.15, I had seen the two flying round about in the usual manner.

May 16th.—Down at about 5.30 (I think a.m., but have omitted to mark it). At 6.30 the two Crows began to fly about, "arreiring," as usual, and at 6.35 one of them went on to the nest, which must, for some time before, and probably all the time, have been empty.

May 27th.—Wishing to see the first activities of Crows

during incubation, I left the house about 2.30 a.m., and got to the place whence I watch the nest in the fir-tree, or rather its site, about 3. It was too dark then for day-birds to be seriously active, though cocks were seriously crowing, as I walked down. I could not, however, see the time by my watch without striking a match.

The first deep "quor" in the neighbourhood—it had a sleepy sound—was at 3.35.

4.20.—One of the Crows flies into the tree and out of it, again, almost immediately. It only just entered the fronds by the nest, and I never quite lost sight of it. I am sure, therefore, in this instance, that it was the same bird that came and went.

4.21.—A moment afterwards the other bird—evidently the sitting one, who has been there all night—flies out of the tree,* and then both fly about from tree to tree in the neighbourhood of the nest, and are very noisy, answering one another. Up till now, except for the deep, single "quor" I have noted, and one or two others—single also and all unanswered—there had been deep silence. I notice now a very considerable difference in the character of the note, especially as uttered by one of the noisy birds.

4.33.—Bird to the nest, alone and in silence. I stay till 4.50, and then leave.

May 30th.—Watched the nest between 11.30 and 12.30 this morning, but no bird either came or went.

June 3rd.—A sad discovery this morning. The tall fir-tree where the pair of Crows I have been watching lately had built has been ascended and the nest flung down—unless, indeed, it has been blown out of the tree; this, perhaps, is possible. I incline, however, to the human hypothesis. I had thought the tree was unscaleable, which shows—if my view is correct—how little I know about it. A sad thing—and no neck broken! A little later I saw the poor birds circling rapidly about, close together.

* Compare entry of April 18th. Here at daybreak there was an exactly similar visit and departure of the male, leaving the female still sitting. But she, too, only stayed a moment before following him off.

A pair of Crows had built their nest in a small plantation of beeches, which two Sparrow-Hawks had also chosen for a similar purpose, the respective trees being but a step or two from each other. In the course of my observations on the hawks, I made the following slight notes on the feeding of the young Crows by their parents :—

June 25th.—Get under my newly-made shelter at 5.50 p.m., and a few minutes afterwards the young Crows begin to cry in the nest. They are answered by a “quor” or two, and one of the parents passes over where I sit. A little while afterwards both sail silently above me, evidently without seeing me. Somewhere towards 7 one of the birds settles silently on a skirting tree of the plantation—then in a few minutes flies from it to another one nearer the nest. There is then a long wait, till at 7.15 either this or the other parent—but I think this same one—flies to the nest, her arrival being preluded by some cries from the chicks. She disappears into the nest, and is evidently feeding them. After a little she comes out and flies from the tree, and the other parent is, as it seems to me, on the point of entering the nest, in his turn, when his mate, flying over my shelter, unfortunately sees me, and raises a loud cry. The one at the nest stands, as it were, petrified for a moment or two, then, with an answering cry, flies after her, and both, settling in trees just behind me, raise a terrible clamour. They cannot, as I gather, quite make me out, but see that something is there, and suspect the worst. They are excited, indignant, and keep up a constant vociferation of loud, deep, expostulatory “quors.” So great is the noise that I almost fear someone’s curiosity may be excited, but the place is lonely, curiosity of the sort, perhaps, not much in evidence, and nobody comes. At last, still clamouring discontentedly, both the birds fly away, though one of them, now, at 7.30, has entered the plantation again.

June 27th.—In the plantation before light, and get under a shelter which I had either made or improved the day before.

At 4.5, 4.14, 4.37, and 5 o’clock the chicks were fed by one of the parent Crows, who came alone, but whether it was each time the same one or the two alternately I am unable to say. The fifth visit, however, was at 5.2, so that, on account of the

shortness of the interval, one may feel sure that it was not made by the bird which had only just left, but by the other one. The same applies to the two next visits, which were at 5.13 and 5.15. There is a good deal of noise at each visit, but this is almost all on the part of the young Crows, who utter sounds like immature caws—or rather “quars” or “arrs”—as well as others of eagerness and expectation, ending in subdued, satisfied murmurs, upon (evidently) having been fed. A low, subdued chuckle, as one may call it, is the old bird’s contribution to the medley. Sometimes, however, it is a louder, clearer, and, indeed, very musical sound—at least, I judge this to be made by the parent, and not by one of the chicks, it being beyond them, I think, and too mature in tone and character.

5.28.—Another visit, the bird remaining perched in the tree for a minute or two after leaving the nest.

5.45.—Another visit, and then another just half a minute afterwards, so that, no doubt, each was from a different parent. For the next visit—at 6.3—I got up my glasses, which I had feared to do before. The view was much obscured by foliage, but the feeding appeared to me to be by regurgitation.

This was the last observation on the birds’ nursery habits that I was able to make, for whilst moving some of the boughs in front of me, so as to get a better view, I was discovered by one of them, and a loud alarm instantly raised. “Quarrrr” now answered “quarrrr” in rapid succession, and the noise was becoming tiresome, when it was put a stop to in an unexpected and interesting manner, for one of the Sparrow-Hawks—evidently by its size and slighter build the male—flew up swiftly through the trees, and descending right upon the more vociferous of the Crows’ back—no doubt delivering, at the instant of contact, an assault with beak and claws—both silenced her and put her to instant flight. Whether the result would have been the same if the Crow had been then in the nesting-tree is perhaps “a question to be asked.” I wish she had been, but she had left it either upon discovering me or just before.

BLUE-WINGED TEAL (*QUERQUEDULA DISCORS*)
BREEDING IN NORTH ICELAND.

By F. COBURN.

In my paper, "Brief Notes on an Expedition to the North of Iceland in 1899" (Zool. 1901, pp. 401-419), at p. 411, I gave "Teal, ? sp.," and stated that I had seen a female Teal with a very dark back leading a brood of dark coloured young towards the water, and that, when feigning lameness to distract our attention from them, she momentarily expanded her wings, when I noticed that she had *one* broad white bar across instead of the *two narrow ones*, which is the complement for the Common Teal (*Q. crecca*).

I was riding at the time, and unluckily my guide, Sigurdur Samlaridason, was in advance, carrying my guns. I shouted to him to use the 12-bore and shoot the bird, but he did not understand, or could not see the bird I was pointing to, and when I took the gun from him and followed up the bird all my efforts to procure her or any of the young were fruitless. I asked readers of 'The Zoologist' for information as to what species of female Teal had one white bar across the wing, but could get no definite information, although I have a hazy recollection that some one did write to me, but who it was I cannot now remember.

At South Kensington Museum I made inquiries, but none of the assistants there knew of any female Teal that had but one white bar across the wing; later I wrote to the curators of some other museums, but could get no satisfactory information.

Remembering my discovery of the breeding of the American Wigeon (*Mareca americana*) in the same district of North Iceland, I naturally thought of the Blue- and Green-winged Teals, and searched all books available to me, both British and American, for information on these birds, but it is almost incredible that in none could be found any description of the female Blue-winged

Teal which made mention of this very conspicuous white bar across the wings, and up to 1904 I had never seen a female of this bird.

The matter rested in this unsatisfactory state until 1904, when I went on a collecting expedition—a very successful one—to the Cariboo district of Central British Columbia, where I found various surface-feeding and diving ducks breeding in abundance.

With the first specimen of a female *Q. discors* I procured I at once recognized the Teal with one broad white bar across the wings which before had been such a puzzle to me. I found also that the young males and immature females have a broader white bar across the wings than the adult female. I brought an interesting series of skins back with me.

Gröndal, in his list of the Birds of Iceland, includes Garganey Teal (*Querquedula circia*), on the strength of an adult male shot on June 16th, 1860, in the same district where I saw the Blue-winged Teal. Many British ornithologists have expressed doubts that such a southern species should have wandered so far north as the Arctic Circle for breeding, and I now have little hesitation in suggesting that a mistake in identification has been made, and the supposed Garganey Teal was an adult male Blue-winged Teal; a mistake very easy to make, and one which has more than once been made here.

Icelanders have but a poor stock of books for reference, and practically no specimens for comparison, and although they possess a good knowledge of their country's birds, they cannot be expected to discriminate closely allied forms. In the case of the American Wigeon they had noticed the difference in the coloration of the head of the males, but thought it was merely a variation, and quite failed to discriminate between the females, although the difference is striking enough to those who know what to look for. I do not suppose that the Blue-winged Teal is a regular breeder in Iceland, but, like the American Wigeon, only a casual visitor for breeding.

When in Iceland I was much impressed by the appearance of some of the females of what I thought were Common Teal as they flew past me, and since my experiences in Central British Columbia I now strongly suspect that future investigation may

prove that occasionally the Green-winged Teal (*Q. carolinensis*) breeds in North Iceland.

The breeding of this bird in North Iceland is a matter of great importance to ornithologists generally, not only as being a first record for Europe, but as strengthening the position of the bird on the British List; and as there is a regular line of migration for American birds to Iceland, it is not surprising that this bird should occasionally join the streams of other ducks to this island, and on the return migration accidentally wander



Photo.

F. Coburn.

BLUE-WINGED TEAL (*Querquedula discors*). Adult female, autumn.

eastwards instead of westwards, and so, at very rare intervals, reach our shores.

As I cannot find a really satisfactory description of the female *Q. discors*, it may be useful to give one here; also an illustration of one of my British Columbian specimens, an adult female shot in September, 1904, showing that the white bar across the wing is so conspicuous that it could not be mistaken for any other duck:—

Top of head: forehead streaked with dirty white, crown and nape dusky blackish, crown minutely freckled on margins of

feathers with lighter brown; hind neck and back paler. Scapulars deep dusky brown, almost black, fringed with dirty white on worn feathers, but pale brown on freshly moulted ones. Tail and upper tail-coverts similar, but rather paler, and not so distinctly margined. Sides of head yellowish white, streaked with dark umber, becoming broader on lower neck and upper breast. Throat and front of upper neck yellowish white, unstreaked. Flanks umber, margined with yellowish white. Under breast yellowish white, some of the feathers with dark umber centres. Abdomen yellowish white, more thickly marked with pale umber. Under tail-coverts blackish umber, broadly margined with dull white. In the wings the outer margins of the primaries are dusky, inner margins paler. Secondaries greenish grey, faintly margined with pale buff. Tertiaries dark umber, margined and centred with pale buff. Greater wing-coverts bluish slate, marbled and broadly margined, but gradually diminishing towards inner ones, with pure white, forming a broad white bar across the wings, very conspicuous when expanded; median and outer wing-coverts pale blue. Axillaries and most of the under wing-coverts white. Bill greenish drab on top, merging into pale drab around margins, spotted and blotched with black, around base pale yellowish drab; inside mouth drabish white. Legs and toes drabish yellow, toes becoming a clearer yellow, webs very pale drab, nails drab. Immature males and females have broader white bars across the wings.

I understand that this season (1912) several English ornithologists intend visiting those districts of Iceland worked by me in 1899, and to some of those who have been in correspondence with me I have communicated the above facts, and asked them to be on the alert for Blue-winged Teal in particular. I have also asked that the case of conscious protective colouring—a very interesting one—I mentioned in connection with the Ringed Plover (*Ægialites hiaticula*), p. 413, shall be investigated if the one party (Mr. Young's) reaches Husavick early enough in the season.

I intended writing upon this subject, and others, immediately after my return from British Columbia, but that period marked the commencement of a multitude of troubles and hard work which gave me no time to devote to these matters.

A SEASON WITH THE BIRDS OF ANGLESEY AND NORTH CARNARVONSHIRE.

By T. OWEN.

(Concluded from p. 313.)

May 8th.—Whilst up in the mountains in September, 1910, we discovered a Chough's nest inside an old mine, and earlier in the same year a pair of Choughs had been seen in that particular vicinity, and were probably the pair that had tenanted this nest. However, when we visited the haunt in 1911 we saw no sign of the birds with "talons and beak all red with blood," and to-day again we did not see them, and on entering into the mine we find that the old nest has been pulled down and the material is all scattered about. On the grassy slope at the entrance to the mine we find a Meadow-Pipit's nest containing a couple of eggs.

Visiting Aber on May 11th, we first of all come across a Chaffinch's nest containing two newly hatched young and three eggs on the point of hatching. Afterwards we walk along the left bank of the river flowing from the lake, and soon turn into a wood on our right. Here we find a nesting-hole of a Blue-Tit, with the bird sitting, as we can tell by the hissing sound which issues from the interior, and after some trouble we manage to dislodge the bird, but after all we were unable to see the contents. At the top of one of the trees is a Carrion Crow's nest, but we are too late for them now. An Owl is known by us to nest in a certain old tree by the corner of the wood, and on reaching it one starts to climb up. The hole in which the Owl nests has a depth of about three feet from the main entrance, but there is also a tiny hole close to the level of the hollow. On gaining this lesser hole and peering inside, the old Tawny can be seen glaring at us, but the next instant it is scrambling out of the hollow leaving to view two young owlets clad in greyish down and with their eyes closed. Before we start on our return journey we see a Cuckoo.

15th.—Penmon is our destination. On the way we call at

the Tawny Owl's nest discovered by us on April 3rd, but the young have flown, for they were very nearly fully fledged when seen by Mr. H. H. Thompson a week previous. At the deer enclosure, Penmon, we make a halt, and see there a couple of Sheldrakes, a pair of Oyster-Catchers, and plenty of Peewits, as well as a few baby Peewits, which, when we approach them, crouch low in the grass. We leave our bicycles at the Priory and then enter the woods, where we soon find a Starling's nest with five eggs. High up in one of the trees we perceive a newly-hacked Woodpecker's hole, and a stone is thrown up which knocks smartly against the bark below the hole, but no bird leaves it. A small colony of Tree-Sparrows nest here, and we discover two of their nests, both containing a couple of eggs.

From the woods we proceed over the common towards Trwyn Dinmor, a high cliff on the Red Wharfe side. Amongst the bracken a Turtle-Dove is seen feeding, and it allows us to approach it within close range before it takes wing and makes towards a clump of hawthorn trees. This species is only known as a passing migrant in the county of Anglesey. When the cliff is reached the Herring-Gulls soon begin to clamour, and a small colony of Kittiwakes which breed here leave the ledges, but they soon return again and take but little heed of us as they fly to and fro, some of them having material in their beaks for their nearly finished nests. The Guillemots and Razorbills hurriedly make a dash for the sea, and a Shag also leaves from somewhere below us. From time to time a few Cormorants with conspicuous white flanks pass in a line a little out at sea. In 1910 we discovered a Rock-Pipit's nest in a cleft near the top of the cliff; and to-day when we happen to look into the same spot we are surprised to see a Rock-Pipit leave, revealing to us a nest containing two eggs. Jackdaws, Swifts, and House-Martins breed at this cliff, and many of them are flying about. A pair of Oyster-Catchers are seen flying away from a flat headland close by, uttering their whistling note as they go, but when we go and search the place to find whether they have laid their eggs, we only come across two empty scratchings.

17th.—A few Common Terns seen by the Menai Straits.

18th.—A visit to two of the Anglesey lakes has been arranged for to-day. When we reach the first, namely, Llyn-y-parc, we only see a few Coots and Herring-Gulls on the water. As we

are searching about for nests we flush a Common Sandpiper from a rock covered with herbage near the water's edge, but it does not appear to have a nest there. Some empty Coots' and Waterhens' nests are found, and the only one that we find containing eggs is a Dabchick's. This nest is floating midst the stems of some tree close to the water's edge, and when found it is covered with wet leaves, weeds, &c., but on removing these we expose five yellow-stained eggs. Quitting this lake we proceed on towards the other, called Llyn Bodgylched. This is a fine sheet of water, with sedge and high reeds covering about one-half of it, and where usually we found a wealth of bird-life. However, very few birds are present to-day, those that we see being Wild Ducks, Coots, Waterhens, Snipe, and a single Sedge-Warbler. Near to the border of the lake we find a Peewit's nest and four eggs, and on proceeding to the opposite side we observe some Sand-Martins skimming about over the lake.

25th.—This afternoon we cycle to Carreg Onnen, a high cliff on the Anglesey coast, where a large colony of Cormorants breed. At length we arrive at our destination, and straightway make for the cliffs. Walking along the top of these, a halt is made, for our olfactory senses have detected the nesting-site of the "Colliers," as the Cormorants are known to the inhabitants around here. The Cormorants are very plentiful, and on the ledges about half-way down the cliff are many nests containing eggs. As we clamber down, all the birds that can see us immediately leave, but so soon as we have hidden ourselves amongst some small nut trees they return, landing clumsily on to the ledges, and some of them uttering a harsh croak while doing so. Some of the male birds are very savage, and fight with each other until one gets too near to the edge and overbalances itself. One pair that we see are very loving, the male bird fondling the female by gently running its bill along the feathers of her head and bringing it around the eyes and over the lores, &c., just as Pigeons do. A few Herring-Gulls are also nesting here, and we observe some of their nests containing eggs. On returning we see a brace of Partridges, a Corn-Bunting on the top of a furze-bush, and later we hear the churring note of a Nightjar, and then see the bird itself leaving a branch of an oak-tree by the road-

side. To-day, too, at one place along the coast we have the pleasure of observing five Ravens in the air together, being a pair of old birds and their three young. This pair, we are glad to say, successfully reared off a brood last year and the year before that to our knowledge, and long may they do so is our most sincere wish.

On Whit-Monday, thanks to a friend who invites us to a yachting cruise, we are able to pay a visit to Puffin Island, off the eastern corner of Anglesey. When the yacht arrives within a couple of hundred yards of the island we board a small boat and are rowed across to it. As soon as we set foot upon the shore the Gulls begin to call out "yac, yac, yac." Every step forward on the grassy top brings us upon nests, the majority of which belong to Herring-Gulls, and some to the Lesser Black-backed species. However, the eggs are so indistinguishable, that in order to ascertain which are which we have to hide ourselves and watch the Gulls settling down again, and then mark a few of them. A few years back the Lesser Black-backs were rather scarce on the island and generally confined to the south side of it, but to-day we see them rise up from all sides. The Lesser Black-backs resent our intrusion far more than the Herring-Gulls do, for frequently one of them swoops viciously at us, rising up again when within a yard or so of our heads. Flying about with the rest of the Gulls is a Greater Black-backed variety, it being at once conspicuous by its larger size, and we watch the movements of this noble-looking bird for some time in order to see whether it will settle on a nest, but this we fail to see. The Kittiwake Gulls, Puffins, Guillemots, and Razorbills reside on the north side, and as we approach that point we observe a large number of the Puffins on the slope near the edge of the cliff. The Puffins are very tame, looking curiously at us, and allowing us to go within a couple of yards of them before they make a dash out to sea, with their quick-beating wings making a loud whirring noise. The ground where these nestle is tunnelled in all directions, and we often sink knee-deep through the turf and cause some of the sitting Puffins to scuttle out of their burrows. Most of the holes that we investigate contain the single egg, these being for the most part fresh, as they did not have the dirty appearance that they attain as incubation advances. At one part of the

cliff the Guillemots, Razorbills, and Kittiwake Gulls have congregated, the former being very plentiful on the wider ledges, but the second named species does not appear to be abundant. Guillemots' eggs are very plentiful, there being many variations in colour and markings. The pretty Kittiwakes have their nests built on the smaller ledges, both above and below the sites of the Guillemots and Razorbills, and some of the nests are placed right against the upright face of the cliff with hardly any support beneath them, most of them containing two eggs. The other birds observed on the island are Jackdaws, Meadow-Pipits, and Rock-Pipits.

29th.—At the sand-dune district of Newborough, Anglesey, in 1909 and 1910, we discovered a pair of Merlins nesting, and to-day we cycle there with the same anticipation. At the rabbit-warren Carrion Crows are very plentiful, and we continually see them being mobbed by Peewits. Wheatears also are very abundant, and we saw one female leave a rabbit's burrow, but we do not stay to dig away at it owing to want of time. At length, after a weary walk over the sand, we come to the area where the Merlins nested, and keep a sharp look-out for them, but after a long search we fail to flush our quarry. We are very disappointed at not seeing the Merlins again, and we hope that they have not fallen to the gun during the rabbit-shooting season, but are now nesting peacefully in another locality. Over a shingle beach close by some Common Terns are flying and screaming, so we proceed there to find out whether or not they are nesting at the place. However, after walking to and fro over the beach and scrutinizing nearly every inch of the ground, we only came across an Oystercatcher's scratching with three eggs. A few Ring Plover are running about the beach, and they often take short low flights, calling out their whistling note.

June 1st.—We first cycle to the seashore within a mile or so of Llanfairfechan, where, on a long shingle beach, a small colony of Lesser Terns breed, and as we walk towards this beach the Terns rise, and soon the air is full of their harsh cries. Searching for their eggs proves a difficult task, and at last we walk some distance away and lie full length upon the ground. No sooner have we done so than we are surprised to see how quickly the Terns alight and settle on their eggs.

We mark a few of these birds, and getting up we once more proceed to the beach, and soon find three nests close to each other—one with one egg, one with two, and the other with three; and at a little distance away still another three eggs which harmonize well with the small pebbles, shells, and bits of dried seaweed amongst which they are laid. We then ride on to Aber, and proceed to a place where last year we found a pair of Redstarts nesting. The Redstarts are tenanting the nest again this year, and when we flush the female from out of the hole in the branch where the nest is built, we see five blue eggs. Near by, in another hole in a tree, is a Great Tit's nest, with eight fully-fledged young, which, when we are looking at them, fly off one by one. Crossing the valley to the other side, we then begin to search about the small trees in the hopes of coming across a Cuckoo's egg, but although we find many Chaffinches' nests with eggs or young, we do not see the object of our search. Cuckoos are very common here, and we frequently see about three of them at a time with little birds following in their wake. From amongst the bracken at one place we flush a Willow-Wren, and on searching we discover its nest with five eggs. A few Garden-Warblers are also seen.

5th.—The Sunday previous to this date we were told about a young Cuckoo, so that to-day we go by train to Felin Hen, in order to see it. On alighting at the little station, we meet our informer, who then guides us along the track of a narrow gauge railway. After a short walk we come to a halt, and are shown the young Cuckoo in a Meadow-Fipit's nest, on a bank within two yards of the rail. It is a little over a week old, and is very fierce, striking out with its beak and hissing when one puts a finger near it. When we whistle it opens wide its beak, revealing to us the red coloration of the inside of its mouth, and, fluttering its tiny wings, seems quite eager for food. During our stay of about half an hour at the nest we did not once see the foster-parents, this being quite contrary to the behaviour of a pair of Robin foster-parents that we once observed, and which were always with their charge, and took no heed of our intrusion. At length we take our leave of the young Cuckoo, and, entering a wood near by, we find a Wren's nest containing eggs, and also a half-finished nest of a Goldcrest.

12th.—We once again visit Llyn Bodgylched, in Anglesey. To-day we see far more birds there than on our previous visit; Coots, Waterhens, and Wild Ducks are very plentiful, and there are also a few Black-headed Gulls present. Some Sedge-Warblers and Reed-Buntings are seen about the vegetation at the water's edge, and in amongst the sedge we come across two empty nests of the former species. We also obtain a glimpse of a pair of Shovelers and their brood just before they disappear and hide in the vegetation; but the beautiful male bird comes forth again into the open, where we watch it for some time, and are charmed by its splendour. Snipe are very common, being flushed at almost every step. About four Teal are seen, their small size and whistling call being characteristic.

15th.—For the last four seasons a pair of Nightjars have been known by us to breed in a certain field near to the Tubular Bridge on the Carnarvonshire side, so to-day we proceed there to see if they are present again this season. As we are cutting through a wood towards the field we disturb a flock of Wood-Pigeons, while a Jay draws our attention by its harsh note, and we obtain a view of it before it disappears amongst the trees. To our disappointment no Nightjar is flushed from the bracken-covered ground, which we beat from end to end.

16th.—A Kingfisher seen when we are out walking along the left bank of the River Cegin.

22nd.—In a large hawthorn-tree in one of the fields just outside the town a Red-backed Shrike's nest, containing five young, is found. The young are fully fledged, and leave the nest on our approach, while both parent birds fly quickly from twig to twig overhead, calling out "chack, chack." The beautiful male bird is rather bold, and frequently comes down quite near whilst we are inspecting the nest and a youngster that we have caught. In the Menai Woods near by we find a Chiffchaff's nest full of fledged young.

This last date brings an end to the pleasant rambles with the birds of the two counties for the season 1912, and, in conclusion, I must mention the name of Mr. H. H. Thompson, Bangor, who was my frequent companion, and to whom I owe my thanks for affording many an enjoyable day.

NOTES AND QUERIES.

MAMMALIA.

Natterer's Bat (*Myotis nattereri*) in Buckinghamshire.—Although Natterer's Bat is probably not uncommon in Buckinghamshire, it has hitherto escaped notice, and it may be well to record its occurrence in Hockeridge Wood, Berkhamstead. At about eleven o'clock on the evening of Aug. 28th, 1912, I captured a male which was flitting about inside a hut in the depths of the big beech-wood.—CHAS. OLDHAM (Kelvin, Boxwell Road, Berkhamstead).

AVES.

Notes on the Habits of *Sturnus vulgaris*.—It used to be a fairly common sight in Yorkshire to see Starlings perched upon the backs of sheep, but I have not often seen them on cattle. I am, however, quite sure that the habit is not so prevalent as was formerly the case. Many years ago a series of articles appeared in the now defunct 'Leeds Mercury Supplement' upon "Ornithology in Relation to Agriculture." I was responsible for the one upon the Starling, and particularly drew attention to this habit. The articles were afterwards published in book form, and were reviewed by the late John Cordeaux. He rather ridiculed my statement, saying he had never observed this habit. A day or two afterwards I was going to the Bempton Cliffs with the late John Farrah, F.L.S. We had not travelled far when Farrah said: "Look! that upsets Cordeaux' ideas, and bears out your statements." There were seven or eight Starlings perched on sheeps' backs, and all of them industriously searching for "ticks" or other insects. In this district they have increased enormously of late years, but I have not heard of any complaints of their doing any damage to crops or fruit. They, however, usurp almost every likely hole for nesting operations, and Woodpeckers have had a sad time. I frequently find perfectly open nests, owing to the inability of the birds to find suitable holes in the neighbourhood.—R. FORTUNE (Harrogate).

Dark-throated Quail in Northamptonshire.—Three years ago I recorded the occurrence of a brown-throated Quail in Oxfordshire

(Zool. 1909, p. 469), and this spring another has been killed at Middleton Cheney, in Northamptonshire, about four miles over our borders. In the example, the subject of the present notice, the dark colour of the chin and throat is more extensive than in the first-named specimen, *i. e.* it extends further laterally. The colour is darker also, the middle of the throat is black, or almost so, and this shades off into rich chestnut-brown at the sides. This bird is no doubt a hybrid between the typical *Coturnix communis* and the chestnut-throated subspecies (or resident local race), *C. c. capensis*. Mr. Grant says ('Handbook to the Game Birds,' vol. i. p. 181) that the results of the interbreeding of these two forms are to be seen in the many male birds from South Africa and South Europe, &c., in which the white parts on the sides of the head and throat are more or less suffused with the bright rufous-chestnut characteristic of the resident bird. I have seen these chestnut-throated birds among the cages full of Quails to be seen in the markets in May, sent from the Mediterranean countries. But it is evident that the hybrids also reach our shores, and probably (to judge from two occurring—or rather being identified—in the neighbourhood within three years) not uncommonly. If only the people on the shores of Italy, &c., would let a few Quails through sometimes at the time of the spring migration, I feel sure we might once more have this grand little bird among our list of regular game-birds; and its pretty call, "twit-middick," might be a familiar summer sound. I have heard one Quail calling here this summer (1912).—O. V. APLIN (Bloxham, Oxon).

Three Nests of *Crex pratensis* in the same Field.—In 1910 I saw three nests of Land-Rails in one small field of about two acres. They were in a field on the Corporation's Sewage Farm at Spofforth. When the grass was being cut two were destroyed, but the third was observed in time to save it, and a tuft of grass was left to protect the nest. The bird did not desert, but continued to incubate her eggs. The caretaker called to inform me, in case I would like to photograph her, as she was exceedingly tame. When I went over the bird was absent, and upon another visit in about an hour or so she was still absent, and the eggs quite cold. It looked as if she had deserted, but it turned out she was the victim of a most unfortunate accident. Quite close to the nest was a large septic tank, and the bird had somehow managed to get into this, and was drowned; her dead body, perfectly fresh, was floating on the top.—R. FORTUNE (Harrogate).

INSECTA.

Clouded Yellow Butterfly (*Colias edusa*), &c.—As this was expected to be a "Clouded Yellow" year, I may mention that I saw a male specimen at Easton, Isle of Portland, on July 17th. "Holly Blue" (*Cyaniris argiolus*).—The present year seems to have been a good one for the "Holly Blue." It appeared in my garden in April and May, and again at the latter end of July.—O. V. APLIN (Bloxham, Oxon).

[*C. argiolus* I found abundant in South-west Cornwall in July and early August, and also in my garden in Surrey.—ED.]

OBITUARY.

ALLAN OCTAVIAN HUME, C.B.

THIS well-known naturalist—both ornithologist and botanist—died very recently at the age of eighty-three. Mr. Allan Hume was the youngest son of the celebrated Joseph Hume, M.P., and spent the best part of his life in India, where he held some high appointments. He did valuable service during the Mutiny, and received his C.B. for gallantry in the field. He made a wonderful collection of Indian birds and eggs, which he presented to the British Museum, "one of the most splendid donations ever made to the Nation, and added to the Museum, which had previously but a poor series of Indian birds, the largest and most complete collection of birds and eggs from the British Indian Empire the world has ever seen." The collection contained 258 types. He also presented a magnificent collection of heads and horns of Indian Ruminants, numbering 223 specimens, as well as 371 skins of Indian Mammals. After his return from India he was much interested in the study of theosophy, but subsequently devoted himself to botany, and his botanical specimens now constitute the South London Botanical Institute of Norwood.

W. L. D.

NOTICES OF NEW BOOKS.

The Early Naturalists ; their Lives and Work (1530-1789).

By L. C. MIALL, D.Sc., F.R.S. Macmillan & Co. Lim.

THIS work of Prof. Miall is an undertaking which must have been beset with two primary difficulties, *viz.* when to begin, and whom to include. The first sentence of the introduction is evidence of the former supposition : "The beginnings of natural history are wholly unknown to us." In the preface we read : "I cannot pretend, however, to have been altogether consistent and impartial in my selection," a witness to our second proposition, so that perhaps "Early Naturalists" might have proved a happier title. The biographical studies commence with Otto Brunfels, botanist (1484-1534), and terminate with Buffon (1707-1788). There is a postscript, "1789 and later," but the real work terminates with the consideration of the great French naturalist and philosopher. And here we cannot refrain from quoting some interesting coincidences and successions given by Prof. Miall : "Linnæus and Buffon were born within four months of each other (1707); Linnæus, Bernard de Jussieu, Haller, Voltaire, and Rousseau died within eight months of each other (November, 1777-July, 1778)."

Dr. Miall is a candid critic, especially when writing of Linnæus, with whose work he seems somewhat out of sympathy. Thus we read : "Linnæus was deficient in the patience and candour necessary for the profitable discussion of deep questions of biology. He was, for example, utterly unable to deal with the great unformulated question of the nature of affinity." But, as we previously were told, "some disapprobation was caused by the place assigned to Man in the *Systema Naturæ*, where he is included in the same order with the Apes, and in the same genus with the Orang," we think Linnæus must have been not altogether averse to candour, nor outside the consideration of affinities. However, differences of view must always pertain to naturalists who approach the consideration of other's work from the standpoint of their own particular studies, and this seems unavoidable; but Prof. Miall has given us a book of biographical

studies and criticisms which largely help to show the evolution in biological thought and knowledge, and for which naturalists will be grateful to him. We wish the work had contained some portraits as well.

Birds of Northumberland and the Eastern Borders. By GEORGE BOLAM. Henry Hunter Blair, Alnwick.

MR. BOLAM has achieved a very considerable success in the preparation of this volume; it is not only a reliable enumeration and history of the birds of Northumberland and the Eastern Borders, but it is enriched with many notes, quotations, and references appertaining to the subject which give his book a unique status in ornithological literature, and make it one of the most readable of county records. The introduction contains biographical notes of no little value referring to old naturalists who lived and worked in Northumberland, and we even find interesting entomological observations. Thus, referring to the Glowworm (*Lampyrus noctiluca*), Mr. Bolam adds: "In addition to its well-known habit of preying upon slugs, I have seen this insect devouring 'green fly' (Aphides)." As regards the nomenclature, that used in Saunders's 'Manual' (except in one or two cases) has been followed, but it is pointed out that, although *Cygnus bewicki*, Yarrell, is applied to Bewick's Swan, it should in strict priority be remembered that it was "Mr. R. R. Wingate, of Newcastle, who first called attention to the distinctness of this species from the common Wild Swan, a discovery which was communicated by him to the members of the Natural History Society of Northumberland, Durham, and Newcastle-on-Tyne on 20th October, 1829. On 16th February following, Selby read a paper to the same Society further elucidating the discovery, and the name of *Cygnus bewicki* of Wingate, then given to it, ought in fairness to have priority. Yarrell's paper setting out the like facts was read to the Linnean Society, 19th January, 1830."

Mr. Bolam has well garnered his notes and observations, and if some have been recorded elsewhere, it is still a matter of congratulation that few indeed are missing from this excellent faunistic publication.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF
SCIENCE, DUNDEE, 1912.

ADDRESS TO THE ZOOLOGICAL SECTION.

By P. CHALMERS MITCHELL, D.Sc., F.R.S., *President of the Section.*

ZOOLOGICAL GARDENS AND THE PRESERVATION OF FAUNA.

IN thinking over possible subjects for this Presidential Address, I was strongly tempted to enter on a discussion of the logical methods and concepts that we employ in Zoology. The temptation was specially strong to a Scot, speaking in Scotland, that he should devote the hour when the prestige of the presidential chair secured him attention, to putting his audience right on logic and metaphysics. But I reflected that Zoology is doing very well, however its logic be wavering, and that as all lines subtend an equal angle at infinity, it would be of small moment if I were to postpone my remarks on metaphysics. And so I am to essay a more modest but a more urgent theme, and ask you to consider the danger that threatens the surviving land-fauna of this globe. A well-known example may serve to remind you how swift is the course of destruction. In 1867, when the British Association last met at Dundee, there were still millions of bison roaming over the prairies and forests of North America. In that year the building of the Union Pacific, the first great trans-continental railway, cut the herd in two. The Southern division, consisting itself of several million individuals, was wiped out between 1871 and 1874, and the practical destruction of the Northern herd was completed between 1880 and 1884. At present there are only two herds of wild bison in existence. In the Yellowstone Park only about twenty individuals remained in 1911, the greater part of the herd having been killed by poachers. A larger number, over three hundred, still survive near the Great Slave Lake, and there are probably nearly two thousand in captivity, in various Zoological Gardens, private domains, and State Parks. It is only by the deliberate and conscious interference of man that the evil wrought by man has been arrested.

A second example that I may select is also taken from the continent of North America, but it is specially notable because it is sometimes urged, as in India, that migratory birds need no protection. Audubon relates that just a century ago Passenger Pigeons existed in countless millions, and that for four days at a time the sky was black with the stream of migration. The final extinction of this species has taken place since the last meeting of the Association in Dundee. In 1906 there were actually five single birds living, all of which had been bred in captivity, and I understand that these last survivors of a prolific species are now dead, although the birds ranged in countless numbers over a great continent.

It would be futile to discuss in detail the precise agencies by which the destruction of animal life is wrought, or the pretexts or excuses for them. The most potent factors are the perfection of the modern firearm and the enormous increase in its use by civilised and barbarous man. Sometimes the pretext is sport, sometimes wanton destructiveness rules. The extermination of beasts of prey, the clearing of soil for stock or crops, the securing of meat, the commercial pursuit of hides and horns, and of furs and feathers, all play their part. Farmers and settlers on the outskirts of civilisation accuse the natives, and allege that the problem would be solved were no firearms allowed to any but themselves. Sportsmen accuse other sportsmen, whom they declare to be no real sportsmen, and every person whose object is not sport. The great museums, in the name of science, and the rich amateur collectors press forward to secure the last specimens of moribund species.

But even apart from such deliberate and conscious agencies, the near presence of man is inhospitable to wild life. As he spreads over the earth, animals wither before him, driven from their haunts, deprived of their food, perishing from new diseases. It is part of a general biological process. From time to time, in the past history of the world, a species, favoured by some happy kink of structure or fortunate accident of adaptability, has become dominant. It has increased greatly in numbers, outrunning its natal bounds, and has radiated in every possible direction, conquering woodland and prairies, the hills and the plains, transcending barriers that had seemed impassable, and perhaps itself breaking up into new local races and varieties. It must be long since such a triumphant progress was unattended by death and destruction. When the first terrestrial animals crept out of their marshes into the clean air of the dry land, they had only plants and the avenging pressure of physical forces to overcome. But when the Amphibians were beaten by the Reptiles, and when from amongst the Reptiles some insignificant species acquired the prodigious possibility of transformation to Mammals, and still more when amongst the Mammals Eutherian succeeded Marsupial, Carnivore the Creodont, and Man the Ape, it could have been only after a fatal contest that the newcomers triumphed. The struggle, we must suppose, was at first most acute between animals and their nearest inferior allies, as similarity of needs brings about the keenest competition, but it must afterwards have been extended against lower and lower occupants of the coveted territory.

The human race has for long been the dominant terrestrial species, and man has a wider capacity for adaptation to different environments, and an infinitely greater power of transcending geographical barriers than have been enjoyed by any other set of animals. For a considerable time many of the more primitive tribes, especially before the advent of firearms, had settled down into a kind of natural equilibrium with the local mammalian fauna, but these tribes have been first driven to a keener competition with the lower animals, and then, in most parts of the world, have themselves been forced almost or completely out of existence. The resourceful and aggressive higher

racers have now reached into the remotest parts of the earth, and have become the exterminators. It must now be the work of the most intelligent and provident amongst us to arrest this course of destruction, and to preserve what remains.

In Europe, unfortunately, there is little left sufficiently large and important to excite the imagination. There is the European bison which has been extinct in Western Europe for many centuries, whilst the last was killed in East Prussia in 1755. There remains a herd of about seven hundred in the forests of Lithuania, strictly protected by the Tsar, whilst there are truly wild animals, in considerable numbers, in the Caucasus, small captive herds on the private estates of the Tsar, the Duke of Pless, and Count Potocki, and a few individuals in various Zoological Gardens. There is the beaver, formerly widespread in Europe, now one of the rarest of living mammals, and lingering in minute numbers in the Rhone, the Danube, in a few Russian rivers, and in protected areas in Scandinavia. The wolf and the bear have shrunk to the recesses of thick forests and the remotest mountains, gluttons to the most barren regions of the north. The chamois survives by favour of game-laws and the vast inaccessible areas to which it can retreat, but the mouflon of Corsica and Sardinia and the ibex in Spain are on the verge of extinction. Every little creature, from the otter, wild cat, and marten, to the curious desman is disappearing.

India contains the richest, the most varied, and, from many points of view, the most interesting part of the Asiatic fauna. Notwithstanding the teeming human population it has supported from time immemorial, the extent of its area, its dense forests and jungles, its magnificent series of river valleys, mountains, and hills have preserved until recent times a fauna rich in individuals and species. The most casual glance at the volumes by sportsmen and naturalists written forty or fifty years ago reveals the delight and wonder of travel in India so comparatively recently as the time when the Association last met in Dundee. Sir H. H. Johnston has borne witness that even in 1895 a journey "through almost any part of India was of absorbing interest to the naturalist." All is changed now, and there seems little doubt but that the devastation in the wonderful mammalian fauna has been wrought chiefly by British military officers and civilians, partly directly, and partly by their encouragement of the sporting instincts of the Mohammedan population and the native regiments, although the clearing of forests and the draining of marshlands have played an important contributory part. The tiger has no chance against the modern rifle. The one-horned rhinoceros has been nearly exterminated in Northern India and Assam. The magnificent gaur, one of the most splendid of living creatures, has been almost killed off throughout the limits of its range—Southern India and the Malay Peninsula. Bears and wolves, wild dogs and leopards, are persecuted remorselessly. Deer and antelope have been reduced to numbers that alarm even the most thoughtless sportsmen, and wild sheep and goats are being driven to the utmost limits of their range.

When I speak of the fauna of Africa, I am always being reminded

of the huge and pathless areas of the Dark Continent, and assured that lions and leopards, elephants and giraffe, still exist in countless numbers, nor do I forget the dim recesses of the tropical forests where creatures still lurk of which we have only the vaguest rumour. But we know that South Africa, less than fifty years ago, was a dream that surpassed the imagination of the most ardent hunter. And we know what it is now. It is traversed by railways, it has been rolled over by the devastations of war. The game that once covered the land in unnumbered millions is now either extinct, like the quagga and the black wildebeeste, or its scanty remnant lingers in a few reserves and on a few farms. The sportsman and the hunter have been driven to other parts of the continent, and I have no confidence in the future of the African fauna. The Mountains of the Moon are within range of a long vacation holiday. Civilisation is eating into the land from every side. All the great European countries are developing their African possessions. There are exploring expeditions, punitive expeditions, shooting and collecting expeditions. Railways are being pushed inland, water-routes opened up. The land is being patrolled and policed and taxed, and the wild animals are suffering. Let us go back for a moment to the Transvaal and consider what has happened since the Rand was opened, neglecting the reserves. Lions are nearly extinct. The hyæna has been trapped and shot and poisoned out of existence. The eland is extinct. The giraffe is extinct. The elephant is extinct. The rhinoceros is extinct. The buffalo is extinct. The bontebok, the red hartebeeste, the mountain zebra, the oribi, and the grysbok are so rare as to be practically extinct. And the same fate may at any time overtake the rest of Africa. The white man has learned to live in the tropics; he is mastering tropical diseases; he has need of the vegetable and mineral wealth that lie awaiting him, and although there is yet time to save the African fauna, it is in imminent peril.

When we turn to Australia, with its fauna of unique zoological interest, we come to a more advanced case of the same disease. In 1909 Mr. G. C. Shortridge, a very skilled collector, working for the British Museum, published in the 'Proceedings of the Zoological Society of London' the results of an investigation he had carried out on the fauna of Western Australia south of the tropics during the years 1904-1907. He gave a map showing the present and comparatively recent distribution for each of the species of Marsupials and Monotremes indigenous to that locality. West Australia as yet has been very much less affected by civilisation than Queensland, New South Wales, or Victoria, and yet in practically every case there was found evidence of an enormous recent restriction of the range of the species. Marsupials and Monotremes are, as you know, rather stupid animals, with small powers of adaptation to new conditions, and they are in the very gravest danger of complete extinction. In the island of Tasmania the thylacine, or marsupial wolf, and the Tasmanian devil have unfortunately incurred the just hostility of the stock raiser and poultry farmer, and the date of their final extermination is approaching at a pace that must be reckoned by months rather than by years.

The development of the continent of North America has been one of the wonders of the history of the world, and we on this side of the Atlantic almost hold our breath as we try to realise the material wealth and splendour and the ardent intellectual and social progress that have turned the United States into an imperial nation. But we know what has happened to the American bison. We know the danger that threatens the pronghorn, one of the most isolated and interesting of living creatures, the Virginian deer, the mule-deer, and the bighorn sheep. Even in the wide recesses of Canada, the bighorn, the caribou, the elk, the wapiti, the white mountain goat, and the bears are being rapidly driven back by advancing civilisation. In South America less immediate danger seems to threaten the jaguar and maned wolf, the tapirs and ant-eaters and sloths, but the energy of the rejuvenated Latin races points to a huge encroachment of civilisation on wild nature at no distant date.

You will understand that I am giving examples and not a catalogue even of threatened terrestrial mammals. I have said nothing of the aquatic carnivores, nothing of birds, or of reptiles, or of batrachians and fishes. And to us who are zoologists, the vast destruction of invertebrate life, the sweeping out, as forests are cleared and the soil tilled, of innumerable species that are not even named or described, is a real calamity. I do not wish to appeal to sentiment. Man is worth many sparrows; he is worth all the animal population of the globe, and if there were not room for both, the animals must go. I will pass no judgment on those who find the keenest pleasure of life in gratifying the primeval instinct of sport. I will admit that there is no better destiny for the lovely plumes of a rare bird than to enhance the beauty of a beautiful woman. I will accept the plea of those who prefer a well-established trinomial to a moribund species. But I do not admit the right of the present generation to careless indifference or to wanton destruction. Each generation is the guardian of the existing resources of the world; it has come into a great inheritance, but only as a trustee. We are learning to preserve the relics of early civilisations and the rude remains of man's primitive arts and crafts. Every civilised nation spends great sums on painting and sculpture, on libraries and museums. Living animals are of older lineage, more perfect craftsmanship and greater beauty than any of the creations of man. And although we value the work of our forefathers, we do not doubt but that the generations yet unborn will produce their own artists and writers, who may equal or surpass the artists and writers of the past. But there is no resurrection or recovery of an extinct species, and it is not merely that here and there one species out of many is threatened, but that whole genera, families and orders are in danger.

Now let me turn to what is being done and what has been done for the preservation of fauna. I must begin by saying, and this was one of the principal reasons for selecting the subject of my Address, that we who are professional zoologists, systematists, anatomists, embryologists, and students of general biological problems, in this country at least, have not taken a sufficiently active part in the

preservation of the realm of nature that provides the reason for our existence. The first and most practical step of world-wide importance was taken by a former President of the British Association, the late Lord Salisbury, one of the few in the long roll of English statesmen whose mind was attuned to science. In 1899 he arranged for a convention of the Great Powers interested in Africa to consider the preservation of what were curiously described as the "Wild Animals, Birds and Fish" of that continent. The convention, which did most important pioneer work, included amongst its members another President of this Association, Sir Ray Lankester, whom we hold in high honour in this Section as the living zoologist who has taken the widest interest in every branch of zoology. But it was confined in its scope to creatures of economic or of sporting value. And from that time on the central authorities of the Great Powers and the local Administrators, particularly in the case of tropical possessions, seem to have been influenced in the framing of their rules and regulations chiefly by the idea of preserving valuable game animals. Defining the number of each kind of game that can be killed, charging comparatively high sums for shooting-permits, and the establishment of temporary or permanent reserved tracts in which the game may recuperate, have been the principal methods selected. On these lines, narrow although they are, much valuable work has been done, and the parts of the world where unrestricted shooting is still possible are rapidly being limited. I may take the proposed new Game Act of our Indian Empire, which has recently been explained, and to a certain extent criticised, in the 'Proceedings of the Zoological Society of London,' by Mr. E. P. Stebbing, an enlightened sportsman-naturalist, as an example of the efforts that are being made in this direction, and of their limitations.

The Act is to apply to all India, but much initiative is left to Local Governments as to the definition of the important words "game" and "large animal." The Act, however, declares what the words are to mean in the absence of such local definitions, and it is a fair assumption that local interpretations will not depart widely from the lead given by the central Authority. Game is to include the following in their wild state:—Pigeons, sandgrouse, peafowl, jungle-fowl, pheasants, partridges, quail, spurfowl, francolin and their congeners; geese, ducks and their congeners; woodcock and snipe. So much for Birds. Mammals include hares and "large animals" defined as "all kinds of rhinoceros, buffalo, bison, oxen; all kinds of sheep, goats, antelopes and their congeners; all kinds of gazelle and deer."

The Act does not affect the pursuit, capture, or killing of game by non-commissioned officers or soldiers on whose behalf regulations have been made, or of any animal for which a reward may be claimed from Government, of any large animal in self-defence, or of any large animal by a cultivator or his servants, whose crops it is injuring. Nor does it affect anything done under licence for possessing arms and ammunition to protect crops, or for destroying dangerous animals, under the Indian Arms Act. Then follow prohibitory provisions, all of which refer to the killing or to the sale or possession of

game or fish, and provisions as to licences for sportsmen, the sums to be paid for which are merely nominal, but which carry restrictions as to the number of head that may be killed. I need not enter upon detailed criticism as to the vagueness of this Act from the zoological point of view, or as to the very large loopholes which its provisions leave to civil and military sportsmen; these have been excellently set forth by Mr. Stebbing, who has full knowledge of the special conditions which exist in India. What I desire to point out is that it conceives of animals as game rather than as animals, and that it does not even contemplate the possibility of the protection of birds of prey and beasts of prey, and still less of the enormous numbers of species of animals that have no sporting or economic value.

Mr. Stebbing's article also gives a list of the very large number of reserved areas in India, which are described as "Game Sanctuaries." His explanation of them is as follows:—"With a view to affording a certain protection to animals of this kind (the elephant, rhinoceros, ruminants, &c.), and of giving a rest to species which have been heavily thinned in a district by indiscriminate shooting in the past, or by anthrax, drought, &c., the idea of the Game Sanctuary was introduced into India (and into other parts of the world), and has been accepted in many parts of the country. The sanctuary consists of a block of country, either of forest or of grassland, &c., depending on the nature of the animal to which sanctuary is required to be given; the area has rough boundaries such as roads, fire lines, nullahs, &c., assigned to it, and no shooting of any kind is allowed in it, if it is a sanctuary pure and simple; or the shooting of carnivora may be permitted, or of these latter and of everything else save certain specified animals."

Mr. Stebbing goes on to say that sanctuaries may be formed in two ways. The area may be automatically closed and reopened for certain definite periods of years, or be closed until the head of game has become satisfactory, the shooting on the area being then regulated, and no further closing taking place, save for exceptional circumstances. The number of such sanctuary blocks, both in British India and in the Native States, will cause surprise and pleasure to most readers, and it cannot be doubted but that they will have a large effect on the preservation of wild life. The point, however, that I wish to make is that in the minds of those who have framed the Game Act, and of those who have caused the making of the sanctuaries—as, indeed, in the minds of their most competent critics—the dominant idea has been the husbanding of game animals, the securing for the future of sport for sportsmen. I do not forget that there is individual protection for certain animals; no elephant, except a rogue elephant, may be shot in India, and there are excellent regulations regarding birds with plumage of economic value. The fact remains that India, a country which still contains a considerable remnant of one of the richest faunas of the world, and which also is probably more efficiently under the autocratic control of a highly educated body of permanent officials, central and local, than any other country in the world, has no provision for the protection of its fauna simply as animals.

(To be continued.)

